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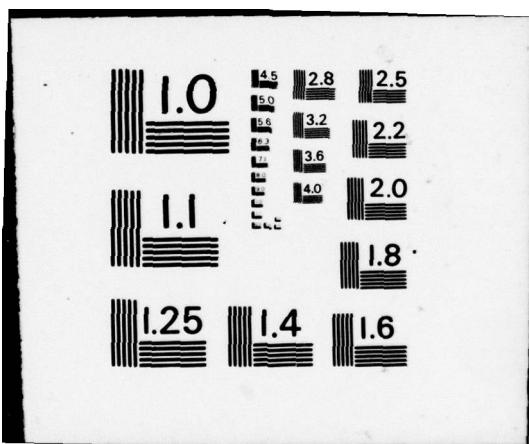
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REVIEW OF AN AIR FORCE JOB
SATISFACTION RESEARCH PROJECT:
STATUS REPORT THROUGH SEPTEMBER 1976

By
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OCCUPATION AND MANPOWER RESEARCH DIVISION
Lackland Air Force Base, Texas 78236

December 1976
Final report for period 1 July 1971 – 30 September 1976

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This final report was submitted by Occupation and Manpower Research Division, Air Force Human Resources Laboratory, Lackland Air Force Base, Texas 78236, under project 7734, with HQ Air Force Human Resources Laboratory (AFSC), Brooks Air Force Base, Texas 78235.

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This technical report has been reviewed and is approved.

RAYMOND E. CHRISTAL, Technical Director
Occupation and Manpower Research Division

Approved for publication.

DAN D. FULGHAM, Colonel, USAF
Commander



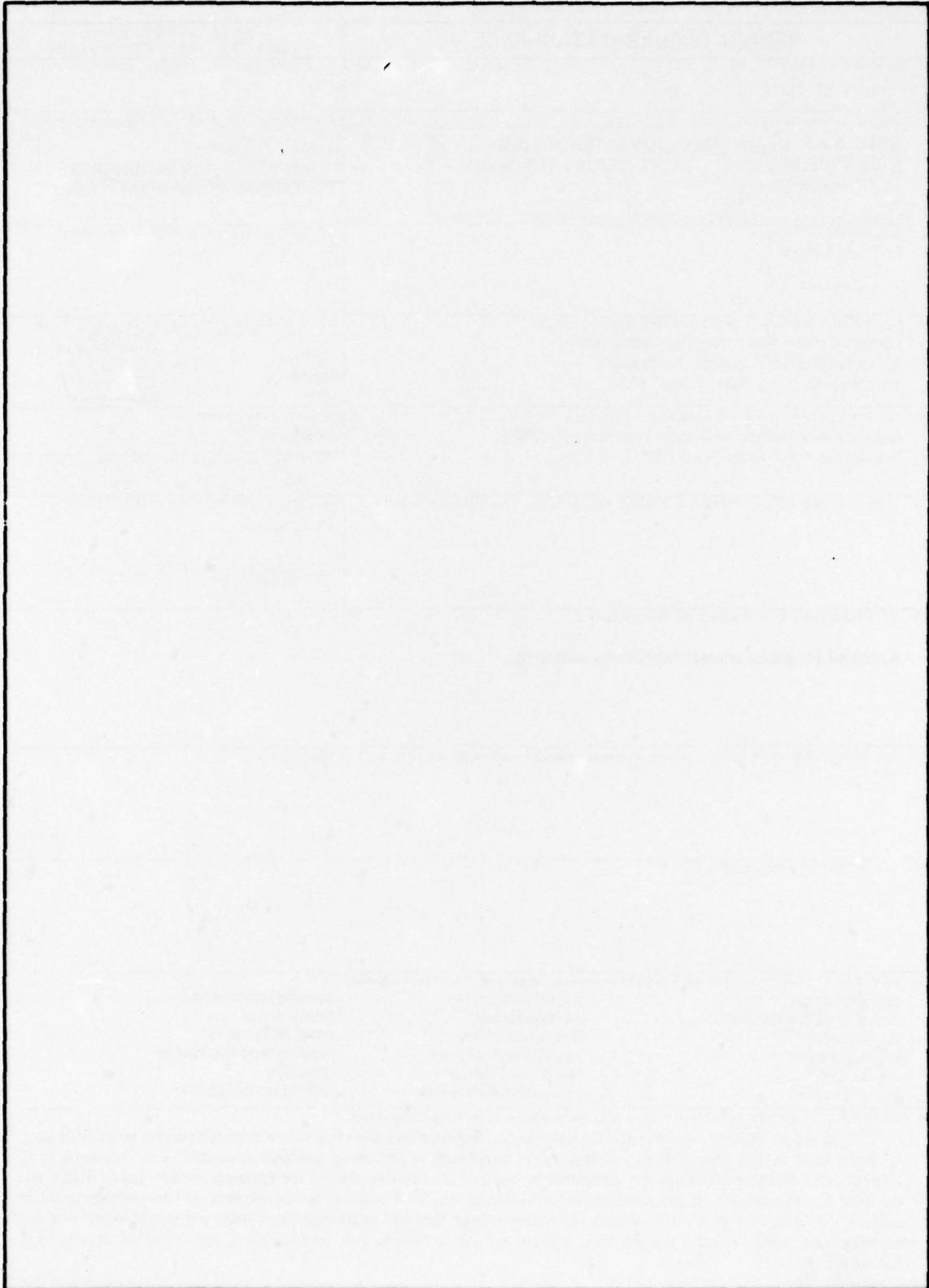
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report presents the status of a long-term comprehensive job satisfaction research project in its fifth year. Ultimate goal of the project is full utilization of personnel, retention of qualified personnel, and maintenance of critical skills. Research findings are presented for each of the interim goals of the research project: (a) to define and measure the dimensions of job satisfaction operating in the Air Force work environment; (b) to identify problem areas which have the greatest potential for improvement through satisfaction research; and (c) to implement job reengineering actions and measure their effects on job attitudes, job performance, and eventual reenlistment decisions.		

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SUMMARY

This report presents the status of a comprehensive job satisfaction research project in its fifth year. Purpose of the program is full utilization of personnel, retention of qualified airmen, and maintenance of critical skills. The approach has concentrated on studying the impact of occupational factors on job attitudes, productivity, and career decisions. Steps outlined in the research project were to (a) define the dimensions of job satisfaction operating in the Air Force work environment, (b) measure satisfaction levels on these dimensions, (c) identify problem areas which have the greatest potential for improvement through satisfaction research, (d) measure the effects which specific changes in job content have on job attitudes, and (e) implement job reengineering actions and measure their effects on job attitudes, job performance, and eventual reenlistment decisions. Studies concerning each step were concurrently conducted although emphasis has been, of necessity, on the initial steps.

To date, basic studies have been accomplished which (1) surveyed the relevant literature and developed a theoretical approach to satisfaction for use in Air Force job satisfaction research projects; (2) defined the dimensions of job satisfaction operating in the Air Force work environment and developed an experimental job attitude inventory to measure satisfaction levels on those dimensions; (3) refined the measurement instrument and developed an operational Air Force Occupational Attitude Inventory; (4) developed an extensive data base containing task-level performance data, background information, job attitudes, aptitude, and loss/gains data for in-depth within and between specialty studies; (5) developed a methodology for identifying specialties which are most likely to yield equitable returns from in-depth study; (6) conducted studies of specific factors associated with dissatisfaction in civil engineer, munitions, and aircraft control and warning ladders and findings have resulted in selected specialty changes; (7) determined that job satisfaction is related to career decisions; (8) developed a location of assignment preference survey and determined preferred geographical characteristics; (9) found that few airmen are assigned to preenlistment preferred work areas even though those receiving such assignments are more satisfied; (10) determined that projecting personnel turnover from self reports of job satisfaction and career intentions was feasible and developed a prediction system; (11) completed a causal analysis of relationships between performance and satisfaction in eight airmen specialties; (12) developed a method for determining desirable task experiences of first-line supervisors and impact of experience inadequacies on supervisors and subordinates; (13) evaluated the relationship between biographical factors and leisure activities to job attitudes; (14) studied longitudinal changes in job attitudes; (15) determined that there were no apparent within career ladder racial differences in airmen work assignments and resulting job attitudes; (16) performed a literature review of leadership approaches and developed a theoretical framework for future research into effects of leadership styles on job satisfaction and performance; and (17) reviewed the job enrichment literature and developed guidelines for future Air Force job reengineering actions.

PREFACE

This research was conducted under project 7734, Development of Methods for Describing, Evaluating, and Structuring Air Force Occupations: task 773405, Derivation of Methods to Provide for Career Progression and Development of Air Force Personnel; work unit 77340501; Impact of Work-Related Factors on Job Satisfaction and Career Decisions. Research conducted under this work unit developed the blueprint for the specialized work units that have been or will be established primarily under task 773405.

Related work units established to date are: 2313T103, Supervisory Style Effects on Productivity and Retention; 2313T107, Improved Productivity Through Use of Intrinsic Rewards; 77340502, Procedures for Optimal Career Development and Talent Utilization; 77340503, Identification and Measurement of Factors for Use in Advanced Reassignment Systems; 77340504, Development of an Instrument for Assessing Levels of Job Satisfaction; 77340505, Develop Methodologies for Identifying Career Ladder and Specific Job Satisfaction Problems; and 77340506, Impact of Interest and Motivation on Task Performance and Job Satisfaction.

Recognition must be given to Dr. Raymond E. Christal and Dr. Joe T. Hazel for their instrumental roles in directing research conducted under task 773405 and to Mrs. Maria M. Courtney for typing the draft manuscript.

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REVIEW OF AN AIR FORCE JOB SATISFACTION RESEARCH PROJECT: STATUS REPORT THROUGH SEPTEMBER 1976

I. INTRODUCTION

Manpower procurement, utilization, and retention requirements under the all volunteer force environment provide an operational requirement for a job satisfaction research program. This report presents the initial job satisfaction research program of the Air Force Human Resources Laboratory's Occupational and Manpower Research Division - its goals, approach, and findings.

During the last four years, a comprehensive plan for job satisfaction research has developed as an outgrowth of the USAF Occupational Research Program (Christal, 1974). The objective of the plan is to study the impact of work related factors on job satisfaction and career decisions - its long-range goal is full utilization of personnel, retention of qualified personnel, maintenance of critical skills, and increased productivity. To this end, the basic steps of the plan are to (a) define the dimensions of job satisfaction, (b) measure satisfaction levels on these dimensions, (c) identify problem areas which have the greatest potential for improvement through satisfaction research, (d) measure the effects which specific changes in job content have on job attitudes, and (e) implement job reengineering actions and measure their effects on job attitudes, job performance, and eventual reenlistment decisions. Each step is logically a sequel to the preceding one, but requirements for timely application of research results did not permit such a lockstep investigation. The operational problems exist now and management decisions will be made in the immediate future based on available information. Therefore, studies concerning each step were concurrently conducted so their implications would be available at the earliest moment. The most comprehensive and thorough research efforts have necessarily concentrated on the first steps.

Specific projects and findings to be discussed are as follows: (a) an extensive review of the job satisfaction/work motivation/job enrichment literature has been completed and implications drawn for Air Force job satisfaction research, including formulation of a basic theoretical model; (b) an occupational attitude inventory has been developed to determine the relevant dimensions of job satisfaction operating in the Air Force work environment; (c) task-level performance and job attitude data have been combined with loss/gains data from the personnel files to form an extensive single file for in-depth within and between specialty job satisfaction research; (d) methods have been developed to identify specialties with the greatest potential for improvement through job satisfaction research; (e) individual studies of several specific factors such as critical supervisory experiences and location of assignment effects on job attitudes have been conducted as have studies to determine relationships between specific job content and job attitudes; (f) preliminary investigations of the relationship between job satisfaction and performance have been completed; and (g) ongoing projects are evaluating the relationship between individual job attitudes and career decisions, to identify those attitudes most related to reenlistment actions. Other current studies are evaluating the interests, motivations, job attitudes, and work and performance histories of incumbents and determining the most effective means of identifying needed job reengineering actions, implementing the changes, and determining the effectiveness of those changes.

II. COMPLETED PROJECTS AND STUDIES

Literature Review and Development of a Theoretical Job Satisfaction Model

A review of 400 civilian and 284 military publications (Tuttle & Hazel, 1974) led to the following conclusions: (a) job satisfaction is related to turnover, absenteeism, and sick calls; (b) the relationship between satisfaction and performance is inconclusive; (c) job satisfaction is multi-dimensional with satisfaction and dissatisfaction representing polar ends of a continuous attribute rather than two separate attributes as presented by the still popular Herzberg (1966) "two-factor" theory; (d) studying specific aspects or dimensions of satisfaction, rather than a global measure, is more likely to provide operationally useful results; (e) no satisfaction measurement instruments were found which covered all major aspects of

military work environments; (f) job satisfaction is a function of the interaction between work factors and personal needs; (g) very few studies have dealt with specific job content data — utilizing instead, subjective reports of job attitudes; (h) very few studies have been longitudinal; and (i) theories of satisfaction tend to be oversimplified with overlapping, frequently conflicting research findings.

The major goals of the literature review were to develop a general theoretical model of job satisfaction to serve as a guide for this operationally oriented research program and to identify the state-of-the-art in research findings. The model development considered five major theoretical positions: (a) two-factor theory, (b) equity theory, (c) instrumentality-expectancy theory, (d) Cornell studies in satisfaction, and (e) need-fulfillment theory. An eclectic model, shown in Figure 1, was developed using all except the two-factor theory while drawing most heavily on the equity model for overall format. The satisfaction process includes both the individual's and the organization's perception (interaction) of the equity between the individual's inputs and those of the work environment as moderated by expectations. The inputs to be considered are objective measures as proposed by the Cornell and Minnesota (need-fulfillment) projects rather than the purely subjective measures used in the equity theory. Output of the model is the individual's satisfaction and the organization's rating of the incumbent's satisfactoriness as they culminate in the final outcome — tenure. A principal strength of the model for a beginning research project is that initial efforts can concentrate on defining the relevant input variables associated with the satisfaction outputs. Subsequent studies can then be concerned with the interaction processes and their implications for productivity and optimal job structures.

One of the principal differences between the general satisfaction model and most popular models is that productivity (effort, performance) is an input rather than an output. The relationship is in opposition to the popular notion that satisfaction results in better productivity. This model emphasizes the work of Porter and Lawler (1968) by suggesting that those who produce best will be the most satisfied. The "chicken and egg" question is important because if productivity is a predictor of satisfaction and not a consequence, productivity can be studied without reference to satisfaction. Measures of productivity are particularly illusive, but to the extent that productivity positively influences satisfaction, problems in productivity can be inferred from reports of poor satisfaction. When low levels of job satisfaction are investigated, it is up to the researcher to determine whether inadequate individual inputs or the structure of the work environment is producing the dissatisfaction. By these arguments, job dissatisfaction could mean that an individual's performance may be below the organization's standards or his performance may not meet his own standards whether through his fault or restrictions imposed by the work environment.

Development of an Air Force Occupational Attitude Inventory

The first two steps of the job satisfaction research plan were to define the dimensions of satisfaction and measure satisfaction levels on those dimensions. The Tuttle and Hazel (1974) review concluded that there were no adequate job satisfaction measurement instruments for use in the military environment; therefore, development of an Occupational Attitude Inventory (OAI) was undertaken.

In the initial development, 35 potential satisfaction dimensions were identified by behavioral scientists familiar with the military work environment. Items were written for each facet, resulting in a final pool of 348 items or approximately 10 items per facet. An 8-point rating scale ranging from Extremely Dissatisfied to Extremely Satisfied was selected for use with the items. Table 1 shows the rating scale and a selection of items. The 348 items made operational use of the inventory prohibitive because of examinee attention span and administration time constraints, but they provided a useful experimental instrument. Developmental procedures and the resulting instrument were documented by Tuttle, Gould, and Hazel (1975). Investigators developing their own job attitude instruments should find the pool of items, associated literature review, and rating scale discussions useful.

Preliminary analyses of the attitude instrument were made to validate the hypothesized satisfaction dimensions operating in the Air Force work environment and to reduce the inventory to a more operationally suited size. A random sample of 3,000 airmen was administered the experimental inventory to provide initial analysis data. Since job satisfaction problems occur primarily with airmen in their first years of enlistment, initial analyses concentrated on first-term airmen. This eliminated 18 supervisory items from many of the analyses because few first-term airmen serve as supervisors.

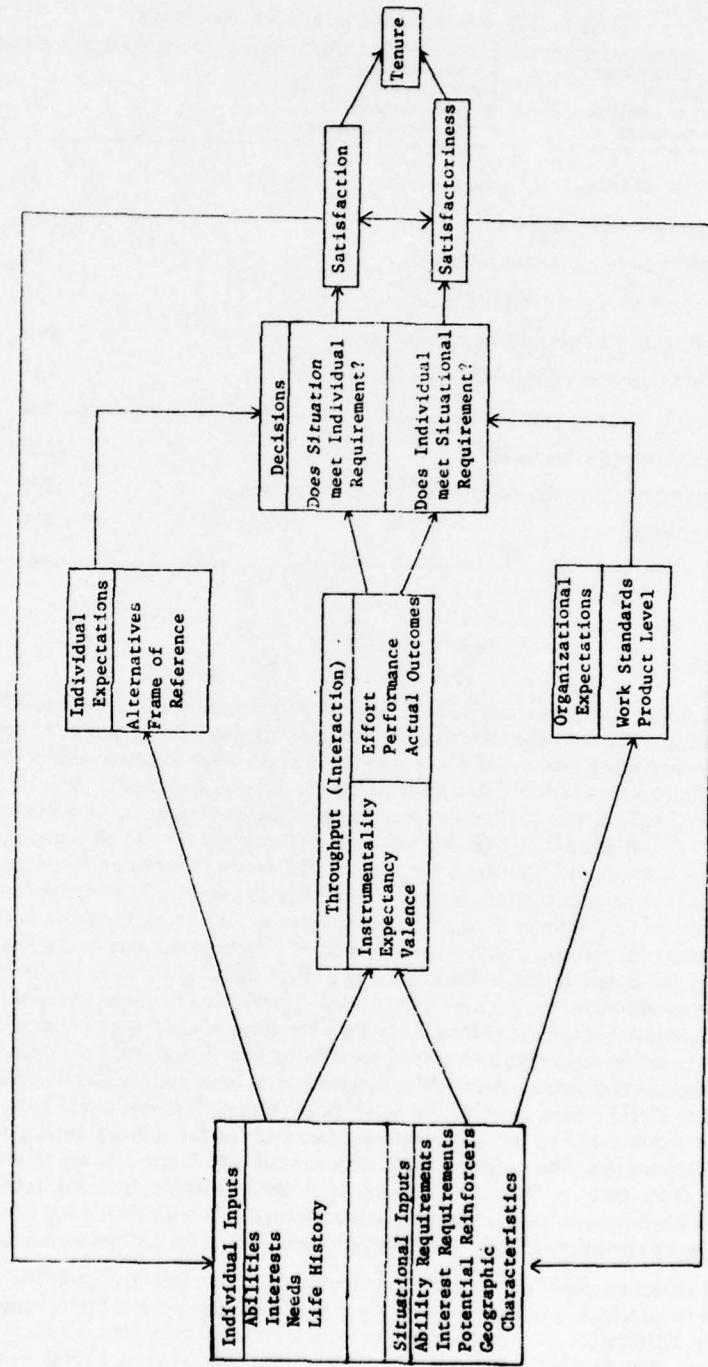


Figure 1. General Model of Satisfaction.¹

¹ From Tuttle & Hazel (1974), p. 46.

Table 1. Job Satisfaction Scale and Selected Items

1 = Extremely Dissatisfied	5 = Slightly Satisfied	Write your answer in this column
2 = Very Dissatisfied	6 = Moderately Satisfied	
3 = Moderately Dissatisfied	7 = Very Satisfied	
4 = Slightly Dissatisfied	8 = Extremely Satisfied	
6. Enjoyment you get from doing your job	6.	_____
23. The chance to plan your own work	23.	_____
48. The opportunity to be of service to others	48.	_____
52. The way your job uses your abilities	52.	_____
115. Adequacy of lighting in the immediate work area	115.	_____
121. The ability of your supervisor to make decisions	121.	_____
204. The relationship between your job performance and chances for promotion	204.	_____
229. The chance to acquire valuable skills	229.	_____
296. The scope and type of on-the-job training you are receiving	296.	_____
329. Your work schedule	329.	_____

A principal components factor analysis with varimax rotation of the responses to 330 items resulted in the 35 factors shown in Table 2. The factors are not entirely the same 35 dimensions hypothesized in the development of the inventory and in fact only 15 of the 35 were substantially replicated. Table 3 summarizes the differences between the hypothesized facets and empirically derived job satisfaction factors. For example, hypothesized work dimensions such as Achievement, Importance, Interest, Job Design, Responsibility, Job Change, Utilization of Abilities, and Variety are all represented by one new factor, the Work Itself. Similarly, the items written for the facets Supervision Received (technical) and Supervision Received (human relations) are now represented by one factor, Supervisor's Competence. While the items of the aforementioned dimensions combined to form single factors, the items in the hypothesized facet of Air Force and Unit Policies and Practices divided into five separate factors, Pay and Benefits items formed four factors, and Social Status items formed two. Five new factors were found which took items from multiple sources although the primary source was identifiable. In summary, several hypothesized separate facets of the work (or tasks) performed combined to form a single work factor while a generalized Air Force policies dimension separated into several specific factors. This finding is a departure from better known civilian job satisfaction inventories such as the Minnesota Satisfaction Questionnaire (Weiss, Dawis, England, & Lofquist, 1967) where most of the work facets represent independent factors. These results further support the requirement to use an inventory developed for the military setting rather than using established civilian inventories. The military work environment and facets relating to job satisfaction do differ substantially from their civilian counterparts. It is quite possible that for active duty military personnel, the work environment has a more pronounced interaction with their total life space and hence components of the work environment take on different meanings than for civilian workers.

For the item reduction phase of the inventory development, the principal problem was how to select a subset of the 348 items which could still capture the domain of reliable job attitude variance measured by the full set of items. Existing item selection programs were of minimal value because there was no adequate external criterion measure to use in the selection process. Selecting items according to their loadings on factors was also inappropriate because items primarily measuring specific item variance would be discarded by the procedure. Therefore, an item selection computer algorithm was developed which uses multiple

Table 2. Hypothesized 35 Job Satisfaction Dimensions and 35 Empirically Derived Varimax Rotated Factors

Hypothesized Dimensions	Number of Original Items	Rotated Factors
Achievement	7	Additional Duties
Activity	8	Assignment Locality
Air Force and Unit Policies and Practices	18	Base Housing and Eating Facilities
Assignment Locality	17	Benefits Provided by Base Facilities
Authority	4	Control Over Others
Co-workers	9	Co-workers
Creativity	10	Economic Security
Economic Security	4	Family Attitude Toward Job
Importance	8	Independence
Independence	9	Information on Policies and Procedures
Interest	9	Job Security
Job Change	7	Knowledge of Results
Job Design	10	Leave and Time-Off Policies
Knowledge of Results	7	Morality of Work
Optional Social Contact	7	Opportunities for Social Contact
Pay and Benefits	12	Opportunity to Stay Busy
Performance Evaluation	8	Personal Growth and Development
Personal Growth and Development	9	Physical Demands of Job
Physical Safety	6	Physical Safety
Physical Work Environment	13	Physical Work Environment
Promotion Opportunity	8	Promotion Opportunity
Recognition	9	Recognition
Required Social Contact	10	Required Verbal and Written Coordination
Responsibility	10	Service to Others
Service to Others	8	Social Contact (non-peer)
Social Status	11	Status in Civilian Community
Sufficiency of Training	12	Sufficiency of Training
Supervision Received-Human Relations	15	Supervisor's Competence
Supervision Received-Technical	9	TDY Costs and Conditions
Tools, Equipment, and Supplies	8	Tools, Equipment, and Supplies
Utilization	8	Travel Requirements and Opportunities
Value of Experience	8	Unit Safety and GMT Programs
Variety	9	Value of Experience
Work Schedule	15	Work Itself
Supervisory Duties	18	Work Schedule
Unclassified	8	
Total	348	

Table 3. Comparison Summary of Hypothesized and Subsequent Empirically Derived Job Satisfaction Factors¹

Replicated Dimensions/Factors		
Assignment Locality		Promotion Opportunity Based on Ability
Co-Workers		Recognition for Good Performance
Economic Security		Service to Others
Independence		Sufficiency of Training
Knowledge of Results		Tools, Equipment, and Supplies
Physical Safety		Value of Experience
Physical Work Environment		Work Schedule
Personal Growth and Development		
Dimensions Whose Items Collapsed Into New Factors		
Hypothesized Dimension		Empirically Derived Factor
Achievement	Job Design	
Creativity	Responsibility	
Importance	Utilization	
Interest	Variety	
Job Change		Work Itself
Performance Evaluation		
Supervision Received-Human Relations		
Supervision Received-Technical		Supervisor's Competence
Dimensions Whose Items Expanded Into Several Factors		
Hypothesized Dimension		Empirically Derived Factor
Activity		{ Opportunity to Stay Busy Physical Demands of Jobs
Air Force and Unit Policies and Practices		{ Additional Duties Information on Policies and Procedures Leave and Time Off Policies Unit Safety and GMT Programs Travel Requirements and Opportunities
Pay and Benefits		{ Base Housing and Eating Facilities Benefits Provided by Base Facilities Job Security TDY Costs and Conditions
Social Status		{ Family Attitude Toward Job Status in Civilian Community
New Factors and Primary Source Dimensions		
Primary Source Dimension		New Empirically Derived Factor
Authority		Control Over Others
Optional Social Contact		{ Opportunities for Social Contact
Required Social Contact		Required Verbal and Written Coordination Social Contact (non-peer)
Unclassified		Morality of Work

¹Items for the hypothesized Supervisory Duties dimension were not included in the factor analysis.

linear regression techniques to iteratively select the items according to their contribution of unique reliable variance to the growing prediction system. The algorithm is titled VARSEL, Variable Selection for Multiple Purpose Prediction Systems in the Absence of External Criteria (Gould & Christal, 1976).

Before applying VARSEL to the item pool, approximately two items with high factor loadings for each of the previously derived 35 factors (71 items) were identified and placed in the starting pool of selected variables. This was done to ensure that the factor structure of the 348 item correlation matrix would be maintained. Then VARSEL was allowed to select the remaining items for inclusion in the operational OAI. After an additional 129 items had been selected, all but a very small portion of the variance could be accounted for by the pool of 200 selected items. For the 148 non-selected items, an average of less than one-half of one percent of reliable item variance was not predictable by the 200 selected items. The final pool of items was refactored to ensure that the factor structure had been maintained – which it had.

Since its development, the operational version of the OAI has been administered to a random sample of 10,000 airmen and the returns are being analyzed to make within and between career ladder job attitude comparisons, to pinpoint problem areas, and to identify those facets of satisfaction which are most related to reenlistment decisions.

Relation of Participation in Sports and Leisure Activities to Job Attitudes

The experimental version of the OAI contained 74 background items which were subsequently reduced to 40 items. Stepwise regression techniques were used to eliminate items which did not have unique relationships to any of a wide variety of job attitudes. Several items such as race; age when obtained first regular paying job; parental mobility, education, socioeconomic status, or individual's contribution to parent's income; birth order; or draft vulnerability of the individual when he entered service did not contribute to job attitude prediction when such factors as age, marital status, academic standing, aptitude, and selected leisure activities were held constant.

A separate analysis of the relationship between job attitudes and sports and leisure activities was conducted and reported by Burtch and Hazel (1975). Using criteria of career intent, job interest, perceived utilization, and a general job satisfaction measure, tennis, fishing, and listening to hard rock or country/western music were the few activities that significantly correlated with job attitudes. These few relationships were found out of the 18 past and current activities considered: frequency of participation in football, basketball, wrestling, boxing, baseball/softball, track, golf, tennis, hunting, fishing, swimming, camping, hiking, jogging/running; time spent reading at home; hobby activities; type music enjoyed; and average hours of exercise. Satisfied personnel tend to have a greater preference for western music and spend more time fishing than dissatisfied personnel who like rock music and play more tennis. Some activity preferences differ between first-term and career airmen but, except for those just cited, generally do not significantly relate to job attitudes when a measure of job tenure (i.e., time in service) is held constant. Few sports and leisure activity differences exist between satisfied and dissatisfied airmen when job tenure is taken into account.

Airmen Assignment Location Preference Study

The importance of one of the OAI identified factors, Characteristics of Assignment Locality, has been demonstrated in recent Air Force surveys. When airmen were asked to indicate factors which were most important in producing satisfaction or dissatisfaction, geographic location of assignment was the most frequently selected cause of both satisfaction and dissatisfaction. A study was undertaken to develop a feasible method for obtaining geographic location preference ratings, to determine strength and variability of location assignment preferences, and to examine certain environmental factors in terms of their influence on geographic location preferences.

A questionnaire was developed, administered to about 500 basic airmen, and refined for field testing. Two preference ratings were obtained for each of 150 Continental United States (CONUS) locations. One rating was obtained using base or station names. The other rating was based on an unnamed location profile consisting of a 22 geographical-environmental variable description of each location. Geographical-environmental variables covered characteristics such as: (a) base and civilian community populations; (b)

distances to the nearest large city, mountains, deserts, ocean, lakes and rivers; (c) area cost of living; (d) availability of educational facilities; (e) average July and January temperatures; (f) average summer and winter humidity, rainfall, and sunshine; and (g) annual snowfall. An 18-point rating scale of -9, meaning extremely undesirable, to +9, extremely desirable, was used for both ratings. Development of the questionnaire has been documented by Tuttle, Brockhaus, and Hazel (1974).

The revised location preference survey was then administered to an Air Force-wide sample of about 5,000 airmen (Hazel, Stacy, & Burtch, 1975). Findings were as follows: (a) most preferred locations tended to be concentrated in Florida, California, and Colorado, while bases in the mid-west and southwest received intermediate ratings and the least preferred locations were in the "northern tier" states; (b) variability in base preference ratings increased with an increase in level of desirability; (c) base name rating and location description rating differences suggested airmen may have a low level of awareness of certain geographical-environmental characteristics for CONUS locations; and (d) significant differences for 14 of 22 geographical-environmental variables were found between the 30 most and least preferred locations. Most preferred locations had larger base and civilian community populations, were closer to the ocean and desert, had a 2 year college readily available, the average winter and summer temperatures were higher, the snowfall very much less (except Colorado), and the percent of daily sunshine was greater. Distributions of even the least preferred locations indicate that significant numbers of airmen in varied specialties do like the locations.

The location preference studies have developed an instrument which can be used to obtain factually based preference ratings of airmen for all major CONUS Air Force installations. With such ratings and the now computerized assignment system it would be possible to consider airman preferences for each location in each assignment action. Currently, only the six most preferred locations (preferences often based on environmental ignorance) are considered in such assignment actions. With today's pressures to decrease permanent change of station (PCS) expenses and increase lengths of assignment, it may be as important to avoid sending airmen to areas of extreme dislike as to send them to their most preferred locations. Initial distributions suggest that there may be sufficient airmen, with the required skills, who do not strongly dislike the least preferred bases to staff these locations. Rank ordering the locations by preference now permits experimental efforts to staff least preferred bases and stem PCS turbulence such as in the Voluntary Stabilized Assignment Program now being tested.

Occupational Survey Data and Preliminary Analyses

Implementation of job reengineering actions to positively influence satisfaction, performance, and career decisions requires that the extent and nature of satisfaction problems in the Air Force be determined, that career ladders which have the greatest potential for improvement through satisfaction research be identified, and that job attributes which are related to job satisfaction and career decisions also be identified. An extensive data base has been developed to probe these critical knowledge requirements. This section describes the development of the data base and preliminary studies and findings.

The Air Force Occupational Survey Program has routinely collected job attitude data with each survey administered since 1966. Of 236 Air Force enlisted career ladders, survey data exist for about 250,000 airmen in 200 ladders. Survey data consists of background information on job incumbents, task-level definitions of jobs performed, and responses to a career intent statement and two job attitude questions; i.e., how interesting the job is and how well it makes use of the respondent's talents and training. The attitude scales are shown in Figure 2. The available data provides a substantive data base for the satisfaction research program.

According to the inventory data, most airmen find their jobs interesting and report their talents and training are well utilized. However, there are extensive differences within and between career ladders and there is some indication that over the last few years, airman reports of dissatisfaction have been increasing. For example, in 150 career ladders surveyed by 1972, 13 had been surveyed twice with 3-year intervals between surveys. During the 1967 to 1969 period, 24% of the airmen at the 3-(semiskilled) and 23% at the 5-(journeyman) level reported their talents and training as utilized "Very Little" or "Not at All." During the resurvey period of 1970 to 1972, 42% and 37%, respectively, of the 3- and 5-level airmen in these ladders reported poor utilization (Gould, 1973). The substantial increases in reported dissatisfaction, 14 to

Career Intent	Job Interest		Utilization of Talent and Training	
I Plan to Reenlist:	I Find my Job:		My Job Utilizes my Talents and Training:	
No, I Plan to Retire	<input type="checkbox"/> 1	Extremely Dull	<input type="checkbox"/> 1	Not at All
No, I Plan to Separate without Retirement Benefits	<input type="checkbox"/> 2	Very Dull	<input type="checkbox"/> 2	Very Little
Uncertain, Probably No	<input type="checkbox"/> 3	Fairly Dull	<input type="checkbox"/> 3	Fairly Well
Uncertain, Probably Yes	<input type="checkbox"/> 4	So-So	<input type="checkbox"/> 4	Quite Well
Yes	<input type="checkbox"/> 5	Fairly Interesting	<input type="checkbox"/> 5	Very Well
		Very Interesting	<input type="checkbox"/> 6	Excellently
		Extremely Interesting	<input type="checkbox"/> 7	Perfectly

Figure 2. Statements of Career Intent and Job Attitudes

18 percent, may be due to any of several reasons, such as deterioration of jobs or restrictions in job progression. It may be that during the survey interval, airmen became more willing to express negative attitudes or this may be symptomatic of the general attitude of the younger civilian population from which the airmen were obtained. During the same period, popular civilian media reported substantial increases in dissatisfaction with work performed. Job enrichment programs have become vogue in civilian industry to counter the trend.

The job attitude differences among career ladders can be illustrated by comparing the percentage of airmen reporting that their talents and training are poorly utilized. Rank ordering the ladders from highest to lowest percentage of 3-level airmen reporting poor utilization, and comparing the two extremes of that distribution (see Table 4), the range is from 63% of the 3-level Pavements Maintenance personnel to none of the Dental Laboratory Technicians (Gould, 1972). Within ladders, the percentage generally decreases as the skill level increases, especially from the 5 to 7 level. Airmen at the 7-level are fully qualified E-6 or E-7 career airmen.

Comparing the specialties at the extreme ends of the rank ordering, there are no readily apparent explanations for the differing utilization reports. At both ends there are ladders with high and low aptitude entrance requirements and diverse content areas; e.g., electronics, equipment repair, security, and medical ladders. This suggests that there are few universal causes of dissatisfaction reports. Individual studies of ladders indicate that factors related to dissatisfaction are essentially unique to each career ladder.

Several examples will be cited which illustrate that specific problems are unique to each ladder and ladders must be separately studied. For example, in the Intelligence Operations ladder, it was found that over half of the tasks airmen were trained to perform in the mandatory 30-week entry-level technical schools were never performed in the field. The technical school had combined the curriculum for Photo Interpreters and Intelligence Operators because of common elements. This had the dual effect of increasing training of nonrelevant tasks and increasing the required aptitude entry level. Aptitude requirements are set by predictability of technical school success and the photo interpreter tasks were highly demanding, thus raising the aptitude required to master the tasks. The curriculum has been adjusted and the aptitude requirement lowered to the requirements of the actual tasks performed.

In the Automatic Tracking Radar Repairman ladder it was found that the 37-week technical training concentrated on teaching highly sophisticated electronic tasks which were not likely to be performed by an airman until his second enlistment. There are two approaches to solving this problem: (a) reengineer the

Table 4. Rank Ordering of Ladders by Percent Claiming Talents and Training are Utilized "Very Little" or "Not at All"

AFSC	Career Ladder	N	Skill Level		
			3	5	7
551X0	Pavements Maintenance	1,059	63	54	15
276X0	A/C Control and Warning	1,689	63	51	27
461X0	Munitions Maintenance	1,590	58	50	21
402X0	Aerospace Photo Systems	261	—	56	35
671X3	Disbursement Accounting	1,354	58	45	NA
611X0	Supply Services	949	53	36	12
303X0	Auto Tracking Radar Repairman	708	51	39	20
234X0	Precision Photoprocessing	836	47	42	15
811X0	Security	3,617	46	36	9
443X0G	Minuteman Missile Mechanic	1,032	44	46	18
204X0	Intelligence Operations	926	43	39	20
915X0	Medical Materiel	1,022	43	26	7
	
	
811X0A	Dog Handler	559	10	24	2
903X0	Radiology	548	9	12	11
432X0	Jet Engine Mechanic	1,622	9	8	6
305X3	Electronics Computer Repairman	1,055	7	14	13
607X0	Loadmaster	1,773	6	12	5
324X0	Precision Measuring Equipment	1,212	6	7	8
322X1	Weapons Control Systems	1,285	5	6	3
272X0	Air Traffic Control	1,518	2	5	7
982X0	Dental Laboratory	486	0	6	3

first-term airman jobs to coincide more with those of the career airman, and hence the initial training program; or (b) provide initial training comparable to the tasks encountered in the first years, and make the advanced training available after reenlistment.

A different situation was found in the Disbursement Accounting ladder where in a single year (1968) most of the airmen input were college graduates who scored at the 95th percentile on all aptitude indices. This career field has many demanding jobs, but not in sufficient proportions to provide challenging jobs to such an influx of talent. The problem is not likely to be reencountered now that the Air Force is experiencing reduced talent inputs in the zero draft environment (Vitola & Valentine, 1972). Another issue raised in the study of this ladder was the impact which supervisory ability has on job attitudes. As in several Air Force specialties, this ladder is combined with other accounting specialty ladders at the 7-skill level. A study by Stacy and Hazel (1975) developed occupational survey techniques to determine critical supervisory tasks necessary for adequate performance as a supervisor and used the accounting ladders as the trial sample. The study concluded that consolidation of accounting ladders at the 7-skill level caused immediate supervisors to be inexperienced in many of the tasks they were supervising. For some of the tasks concerned, it was critical to the job satisfaction of both the job incumbent and immediate supervisor that the supervisor have experience in performing the task. Failure of the immediate supervisor to have these critical experiences had negative impact on the job satisfaction of both incumbent and supervisor. Findings resulted in a management decision to separate the ladders. The results will have implications for career progression patterns and career field structures in other specialties, particularly those with a large number of highly specialized homogeneous job types. Interim findings in another specialty, Aircraft

Control and Warning (AC&W) Specialist ladder, support the importance of adequate supervisory experiences to incumbents' job attitude (Burtch & Gould, 1977). An extensive AC&W follow-up study has been initiated.

To date, the most extensive study of satisfaction elements in a specific ladder was conducted in the Pavements Maintenance ladder where dissatisfaction was found to be largely a function of the correctable mundane nature of the job domain (Stacy, 1973). Demanding tasks were being performed but a series of career field structure, work assignment and contracting policies, job-time accounting procedures, and civilian/military mix practices had resulted in civilians, contractors, or a very select group of military equipment operators performing all the demanding, educational, and interesting work. As has been frequently the case of job satisfaction studies, circumstances detrimental to the Air Force were uncovered - in this case, failure to develop a military capability in pavements maintenance. Career field changes based on the study findings were implemented by the career field managers and a 1974 resurvey of the career field indicated dramatic improvements in job satisfaction during a time of Air Force-wide increasing job dissatisfaction.

The pavements maintenance study was particularly important because it demonstrated that occupational survey data followed up by field interviews could be used to determine the nature of job satisfaction problems and provide remedial recommendations. However, field interviews are expensive in time and manpower and the next question is, can surveys also be used in place of the field interviews? Surveys specially designed to collect the data previously obtained by interviews have been used in the Munitions Maintenance and Aircraft Control and Warning Radar ladders. The investigators conclude that followup surveys can be utilized in lieu of follow-up interviews to identify the nature of satisfaction problems and often suggest remedial actions (Burtch & Gould, 1977).

Studies of other ladders with high dissatisfaction have found that some jobs are mundane and repetitious, or highly sophisticated training was given for tasks not usually performed for several years after training, or the jobs were highly restricted and only a few tasks were performed. On the other hand, there have been career ladders where the major complaint centered on the available assignment locations (Gould & Christal, 1971). As stated before, factors related to reported dissatisfaction are essentially unique to each career ladder. There are, however, a few relationships which have been consistently found. Those job incumbents whose jobs are more demanding and varied and are most related to their aptitude, education, and Air Force training are more satisfied with their jobs and tend to express positive predispositions toward Air Force careers. Regression studies indicate that job difficulty, number of tasks performed, and aptitude requirements of the job are positively related to job attitude while aptitude, education, and time in service for first-term airmen are negatively related. Time in service is positively related to job attitude for career airmen.

For most of the specialties selected for in-depth study thus far, many of the problems encountered have had solutions requiring a combination of job reengineering and management decisions. However, the cost of studying such specialties is high and not all specialties studied have produced recommendations for operational remedies. The search continues for more cost-efficient approaches for in-depth study of specialties.

To further the study of satisfaction between and within specialties, a project was undertaken to organize the Occupational Survey data into a single large data file. Thus far, the occupational survey data of 215,000 airmen in 195 career ladders have been matched with personnel records and placed in a single data file. The file contains task-level performance, job attitude, personal background, aptitude, and loss/gains data. Four example uses of the single data file to be discussed are: (a) identifying specialties with the greatest potential for improvement through satisfaction research, (b) the validation of statements of career intentions and relationships between job attitude and actual reenlistment decisions, (c) effects of receiving preferred job assignments on job satisfaction, and (d) longitudinal study of the causal relationships between job attitude and performance.

Identifying Specialties with the Greatest Potential for Improvement Through Satisfaction Research

One of the first uses made of the data file was the preliminary identification of career ladders exhibiting the greatest potential return from in-depth job satisfaction study. Potential return is meant to be positively influencing career decisions or improving job performance or job progression. A proposed

procedure for identifying potential ladders developed regression lines for separate career ladders to show the relationship between measures of job attitude and the length of time respondents have been on active duty (Christal, 1974; Gould 1974). These cross-sectional profiles are then interpreted in a longitudinal fashion to infer the job attitude/time-in-service and job attitude/career decision relationships. Although the validity of such longitudinal inferences originally relied on logical explanations, Gould (1976) validated through empirical means the longitudinal inferences made from cross-sectional attitude data. The identification system evolved from the observation that months of total active Federal military service (TAFMS) is generally negatively related to satisfaction for airmen in their fifth through 48th month of service and positively related thereafter.

The TAFMS/satisfaction relationships imply that airmen become increasingly dissatisfied as they approach the reenlistment decision point at the 48th month and that airmen who are in their 49th or later month, i.e., those who made a positive reenlistment decision, find their jobs increasingly more satisfying. There is usually a large positive jump in job attitude from the 48th to the 49th month. The jump or gap between the 48th and 49th month suggests three possible interpretations. Either (a) some type of job attitude change occurs immediately after a commitment is made for "four more years" of service, or (b) the gap is due to a "residualization process" where those finding their jobs dull or undemanding tend to leave the Air Force with the more satisfied airmen remaining after the 48th month, in which case the size of the gap indicates the impact of job attitude on the career decision, or (c) both effects are jointly occurring. A longitudinal study (Gould, 1976) demonstrated that so-called cognitive dissonance or attitude change explanations do not account for the jump after the 48th month and in fact the gap is due to a "residualization process."

The regression model used to infer probable impact of job attitudes on reenlistment decisions took the form:

$Y = a_1 X_1 + a_2 X_2 + a_3 X_3 + a_4 X_4 + a_5 X_5 + a_6 X_6 + a_7 X_7$ where Y was the attitude criterion and the X vectors were defined as follows:

$X_1 = 1$ if months of service ≤ 48 ; 0 otherwise^a (dichotomous vector)

$X_2 = 1$ if months of service > 48 ; 0 otherwise (dichotomous vector)

$X_3 =$ Number of months of service if ≤ 48 ; 0 otherwise (linear vector)

$X_4 =$ Number of months of service if > 48 ; 0 otherwise (linear vector)

$X_5 = (X_3)^2$ (a curvilinear vector)

$X_6 = (X_4)^2$ (a curvilinear vector)

$X_7 =$ Average aptitude index on Airman Qualifying Examination (AQE)

The model permitted development of unique weights for airmen in their first enlistment (weights a_1 , a_3 , a_5) and for airmen who were beyond their 48th-month of service and had, thus reenlisted at least once (weights a_2 , a_4 a_6). The squared terms, X_5 and X_6 were included in the model because the attitude/TAFMS relationships were frequently found to be curvilinear. Average aptitude (X_7) is included in the model to hold constant the effects of aptitude differences by TAFMS group since aptitude is negatively related to attitude.

To demonstrate the regression model, 8,000 cases were randomly selected from the data file and regression weights computed for the interest and utilization job attitude criteria. Resulting TAFMS and job attitude relationships are shown in Figure 3. The regression curves display the expected attitude value of individuals at various months of service. In this case, the values were computed for individuals having an average aptitude score of 64.43, the mean aptitude of the 8,000 cases. Therefore, the displayed expected values are for individuals, by TAFMS, who have the group mean aptitude. Interpreted in a longitudinal

^aThe model is possible because initial enlistments were for 48 months. Recently, 72-month initial enlistments have become possible and the model will have to be modified accordingly when 72-month enlistees are included in a sample.

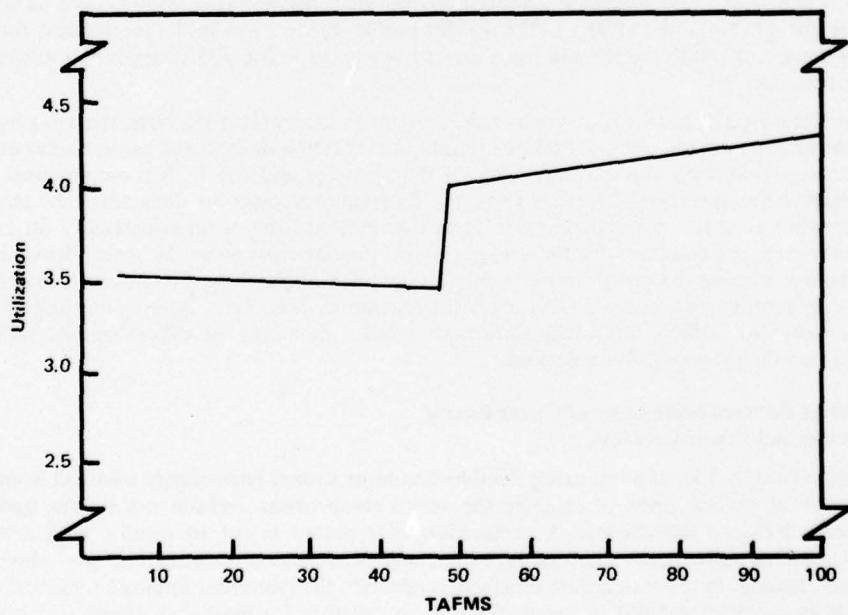
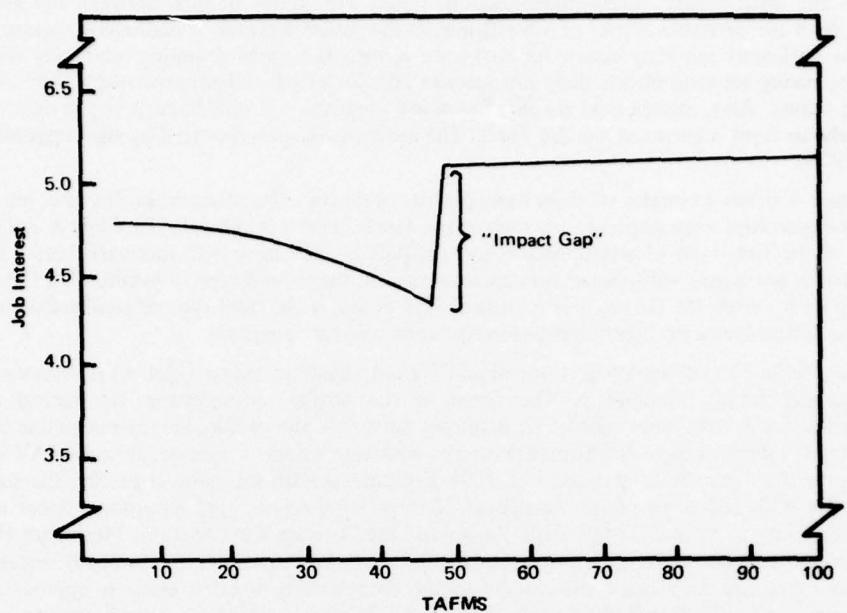


Figure 3. Job Attitudes vs. TAFMS (holding aptitude constant)¹ for an 8,000 Case Sample.

¹ Average aptitude = 64.43

fashion, the profiles suggest that there is a decline in both interest and perceived utilization as airmen approach the 48th month reenlistment decision point. The jumps or gaps between the 48th and 49th month reflect the probable impact of job attitude on the career decision. A reasonable assumption is that if there was sufficient job progression for first-term airmen (i.e., jobs requiring increasing technical skills and/or increasing responsibility), their job interest and perceived utilization would not be declining with increased tenure. Also, airmen who do experience job progression should have more job satisfaction and be more likely to favor a career in the Air Force. The assumptions are supported by the longitudinal study by Gould (1976).

Figure 4 shows examples of three basic profiles obtained when attitude, in this case, job interest, and TAFMS relationships were displayed for each of the career ladders in the data file. Plots A and B depict two versions of the first type of relationship where attitude is decreasing with increased tenure for first-term airmen, but is increasing with tenure for career airmen. In the second type of profile, Plot C, job attitude is increasing with tenure for the first-term airmen. Plot D shows the third type of relationship where there is little or no difference in job attitude between first-term and career airmen.

The profile of the Aerospace Control and Warning Systems ladder (Plot A) is representative of the most generally found relationship. The shape of the profile approximates the radical sign used in mathematics and is sometimes called a "square-root curve." In the profile, the regression line represents the predicted job interest scores for airmen with the 894 case sample's average aptitude (AV AI) of 63.79 according to their months of service (5 to 100). For ladders with this general profile, the size of the gap between the 48th and 49th month, steepness of slope of the lines, and linear/curvilinear nature of the relationships vary between ladders as is shown for the Aircraft Fuel Systems Mechanics (Plot B). The 276X0 ladder appears to be a better candidate than the 424X0 ladder for in-depth research since job interest is lower and decreases more rapidly as the reenlistment decision point is approached. Also the "impact gap" is larger. It would be more likely that 276X0 jobs could be reengineered to produce more interesting jobs and produce positively accelerating job interest as the reenlistment decision point is approached. If reengineering intervention is made for the expressed purpose of building job progression into the 276X0 ladder and subsequent job interest is measured, the resulting profile could be similar to that shown for the 435X0 ladder (Plot C). The 435X0 profile shows a low initial job interest that accelerates positively toward the 48th month and has a limited impact gap. The 435X0 ladder represents the second basic profile shape.

The third type of profile is shown by the Programmer ladder (Plot D). Here, there is a high initial and subsequent level of job interest and little relationship between job interest and career decisions. The 511X1 profile is consistent with the characteristics of the specialty and the civilian employment demand for programmers at the time the ladder was surveyed. Programmers' tasks are demanding and tend to increase with experience to match the programmers' expertise; there is little or no opportunity for job expansion through external intervention. Further, experienced programmers were in great demand by civilian companies and starting salaries were extremely competitive at the time the survey data were collected. Ladders with profiles such as the 511X1 show little potential for job engineering research. If reenlistment problems exist for ladders with this third-type profile, monetary or other benefits rather than job engineering are the most probable solutions.

Relationships Between Statements of Career Intent/ Job Attitudes and Career Decisions

Using the data file, approximately 53,000 first-term airmen respondents who had been surveyed at various years of service prior to reaching the actual reenlistment decision point were traced and their reenlistment decisions determined. A comparison of reported intent to reenlist with actual "in/out" decisions reflected a significant relationship, with a large percentage of those saying "yes" staying and those saying "no" leaving. In terms of future satisfaction research, the important finding here is that career intent statements are sufficiently valid to permit their use as criterion for measuring effects of job reengineering actions on eventual career decisions, rather than waiting for lengthy longitudinal follow-up studies to assess the reenlistment effects.

As a management tool, career intent statements in the occupational surveys can also be used to estimate personnel turnover by Air Force specialty code (AFSC). In managing personnel retention under the total objective plan for career airmen personnel (TOPCAP) system (USAF Personnel Plan, 1971), the

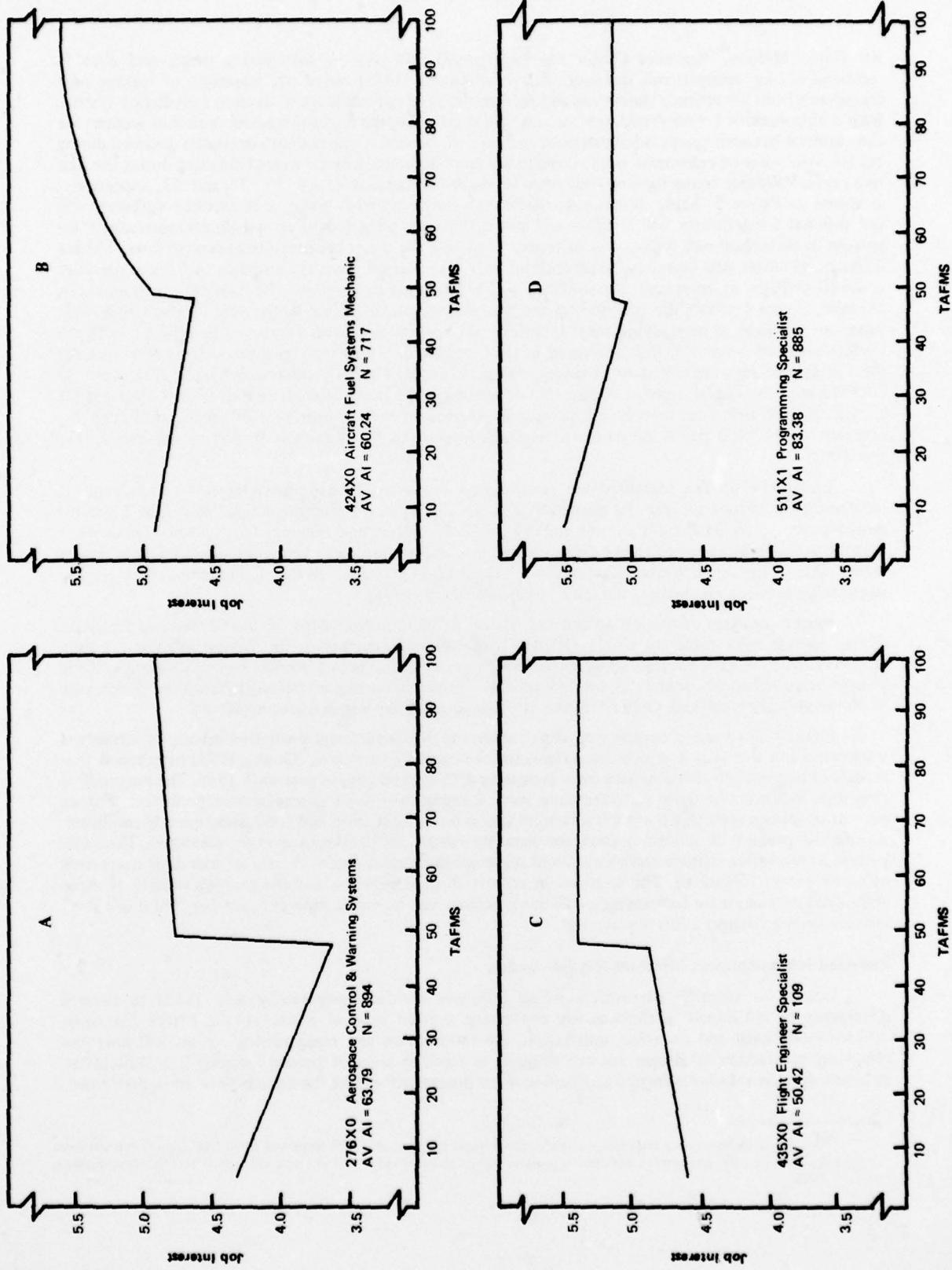


Figure 4. Example profiles obtained when job interest and TAFMS relationships (aptitude held constant) were displayed.

Air Force Military Personnel Center has experienced difficulty in anticipating surges and ebbs in reenlistments by occupational specialty. Alley and Gould (1975) tested the feasibility of making such predictions from job attitude statements and used model seeking techniques to develop a prediction system. With a dichotomous 1 = reenlisted, 0 = was discharged criterion, the regression model took into account the time interval between survey administration and time of decision. Career intent statements obtained during the last two years of enlistment were considerably more accurate than statements obtained during the first two years. Validities across the first four years for the total sample were .14, .17, .37, and .53, respectively, as shown in Figure 5. Actual functional relationships between career intent responses (2 = definitely will not reenlist; 5 = definitely will reenlist) and career decisions appeared to be curvilinear, particularly for persons in their third and fourth year of service. However, the career intent statements were found to have different validities and functional relationships with the criterion when specific duty Air Force specialty codes (DAFSC) were compared. The validities of the statements also appear to be increasing with time. For example, Figure 6 shows the relationship for the total sample according to the year in which they were surveyed. Of those airmen saying they definitely will reenlist, 50 percent surveyed in 1966 or 1967 did reenlist while 80 percent of those surveyed in 1971 reenlisted.^b Using the regression weights developed for the full sample regardless of date of survey, Alley and Gould (1975) predicted reenlistment rates for 30 DAFSCs with the largest number of cases and obtained average errors of prediction of from 9.4 percent for airmen in their first year to only 2.1 percent for airmen in their fourth year of service. Although the accuracy of the estimates is substantial, numerous suggestions for improving prediction accuracies were provided.

Gould (1976) also identified the relationships between job attitude statements and subsequent reenlistment decisions for the 30 populous DAFSCs. Multiple R's (for predicting the in/out criterion) ranged from .12 to .31 for job interest and .11 to .30 for talents and training. These results demonstrate that job attitude is related to career decisions and that the magnitude of the relationship varies by career ladder. One of the few consistent findings in job satisfaction literature, civilian and military, is the positive relationship between satisfaction and tenure (Tuttle & Hazel, 1974).

Further analyses of the job attitude and career decision relationships for the 53,000 case first-term airmen sample were made by Gould (1974). Total sample responses to the 7-point job interest scale (1 = Very dull; 7 = Very interesting) were plotted (Figure 7) against actual reenlistment actions and a strong positive relationship was found. Twenty-six percent of those reporting interesting jobs in their fourth year of service actually reenlisted. Only 6% of the 4th year airmen reporting dull jobs reenlisted.

Figure 8 illustrates a consistent finding concerning the reenlistment prediction validity of attitudinal statements and the year in which the statements were made. Past studies (Gould, 1973) have found that reports of negative job attitudes have been increasing with each successive year since 1966. The longitudinal data now indicate that those statements are also becoming more valid as reenlistment predictors. Fifteen percent of airmen reporting that their jobs were very interesting in 1966 and 1967, subsequently reenlisted. Almost 40 percent of airmen making the same statements in 1971 subsequently reenlisted. The same pattern of increasing attitude and reenlistment relationships in more recent years were found for statements of career intent (Figure 6). The increases in reports of dissatisfaction and the growing validity of those attitudinal statements for forecasting reenlistment actions may be a reflection of a growing "tell it like it is" attitude among younger military personnel.

Preferred Job Assignment Effect on Job Satisfaction

Efforts to identify job aspects which influence satisfaction generally have failed to control differences in individuals' preference for performing a given type of work. To the extent that such differences do exist and do affect satisfaction, job intervention and reengineering actions will have less effect on satisfaction if airmen are not assigned to work in areas of general interest. It is difficult to structure specific jobs for increased satisfaction if the incumbents dislike the basic type of work performed.

^bBecause a dichotomous criterion was used, the percentages can also be interpreted as probabilities of reenlistment or correlations; i.e., the correlation between a positive intention to reenlist in 1971 and the actual reenlistment decision was $r = .80$.

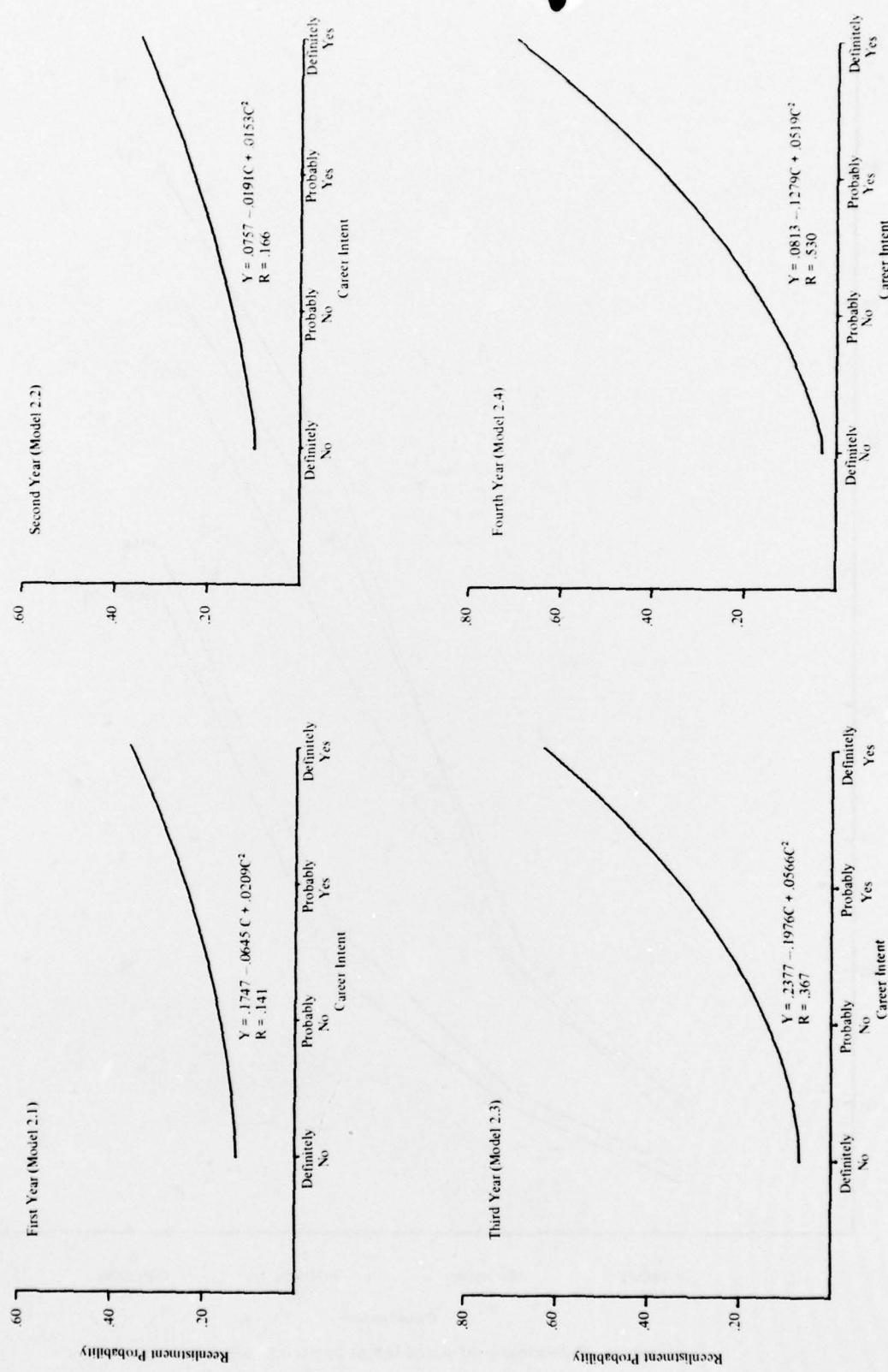


Figure 5. Relationships between career intent and career decision by TAFMS year group. (from Alley & Gould, 1975)

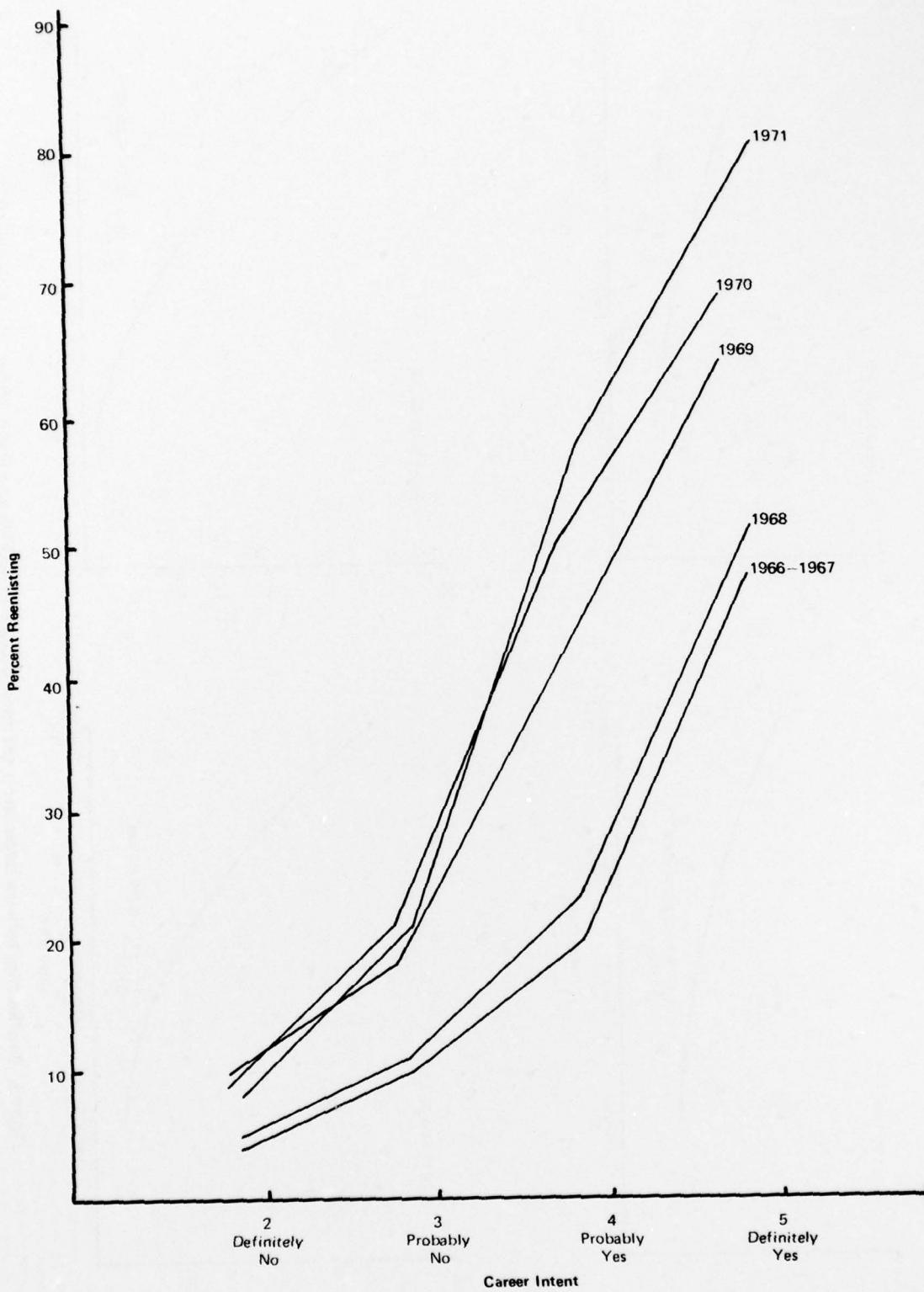


Figure 6. Relationship of stated intent to percent reenlisted across years.

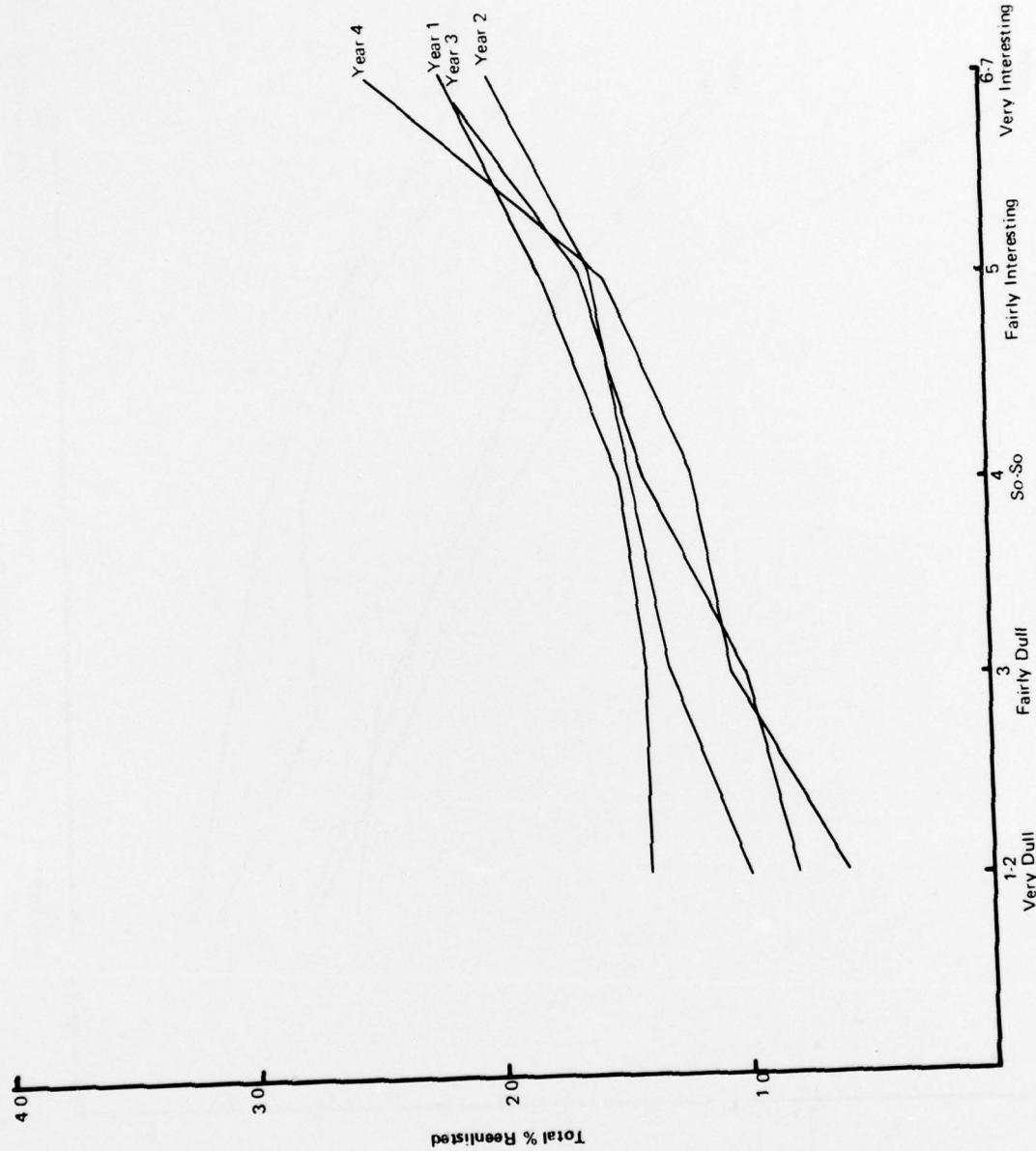


Figure 7. Relationship of job interest and career decision for first-term airmen.

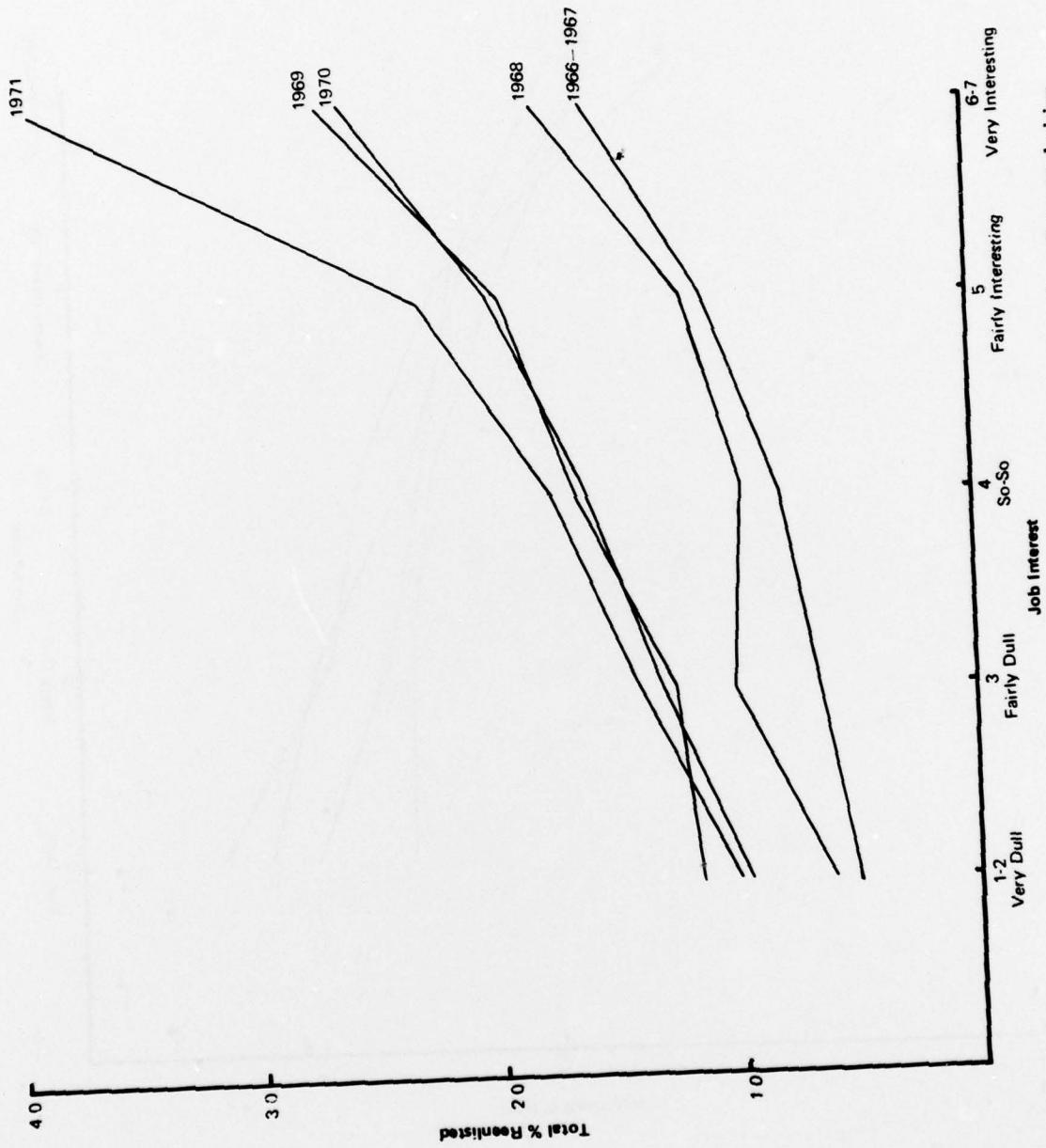


Figure 8. Relationship of job interest statements, date statements were made, and reenlistment decision.

Also, if airmen like the general area of assigned work but are dissatisfied with their specific jobs, more of the variance in job satisfaction will be associated with the work environment and subject to improvement through changes in that environment. Two initial questions are: (a) to what extent do airmen get their work assignment preferences, and (b) are airmen more satisfied if they receive their preferred assignments? The job satisfaction data file contains information from preenlistment personnel records and provided ready answers to the questions.

Hendrix and Ward (1975) drew a 20,000 case sample of first-term airmen from the data file and generated four categorical vectors indicating correspondence between preenlistment preference and actual work assignment: each individual was assigned to his (a) first preference, (b) second preference, (c) third preference, or (d) a job not stated as a preference. Seventy five percent of the airmen had not received any of their preferences, and only 15 percent received their first preference. Validity of these preenlistment preference statements is questionable since most preenlistees know very little about specific tasks involved in military specialties and specialty titles are frequently misleading. Despite the lopsided distribution (PQ split) in receipt of assignment preference and the questionable validity of the preference statements, airmen who received their first preference were significantly more interested in their jobs and felt their talents and training were better utilized. The job attitude statements were made from six months to four years after the preference statements. The current system assigns few airmen to preferred work areas even though those receiving preferred assignment tend to be more satisfied.

Several steps are underway to increase the validity of individuals' vocational preference statements (Echternacht, Reilly, & McCaffrey, 1973) and assignment of individuals to preferred work areas (Hawkins, Crow, & Haltman, 1974; Ward & Haltman, 1974). To the extent that these efforts are successful, the other work conducted under this job satisfaction research project should be enhanced.

Causal Relationships Between Job Attitude and Performance

Hickerson, Hazel, and Ward (1975) conducted a study to determine an appropriate method for evaluating performance and satisfaction relationships and to explicate the causal nature of the relationships in selected specialties. A sample was obtained of 1,352 airmen, in eight specialties, who had twice completed occupational inventories with a three-year survey interval. Airman Performance Report (APR) and specialty knowledge test (SKT) scores were used as the performance measures while job interest and perceived utilization of talents and training were the attitude measures. A number of control and moderating variables were included in the study such as self-reported personal history variables and task-level job specific variables obtained from the occupational surveys. Aptitude and method of specialty assignment indicators obtained from the personnel records were also included.

Three types of analyses were conducted: cross-lagged panel correlation, simple regression, and extended multiple linear regression analyses. The cross-lagged correlation and simple regression techniques yielded similar conclusions concerning causal influence. Extended regression analyses (assuming nonlinear relationships and multiple moderating variables) yielded different conclusions concerning causal influences. Cross-lagged correlational and simple regression analyses were inadequate and led to incorrect conclusions because of their failure to account for complex interactions among variables of concern and concomitant variables. The finding is supported by many studies (Gould, 1972, 1973, 1974, 1976; Tuttle & Hazel, 1974) that have demonstrated numerous individual and job content variables which are related to job attitudes and thus, must be taken into account to assess job attitude changes.

Analyses performed on all specialties combined (total sample) suggested that perceived utilization of talents and training influenced test performance, test performance influenced job interest, and job interest influenced rated job performance. There were, however, considerable job specialty differences in performance-satisfaction relationships, especially when moderating effects of personal history, work experience, and job complexity were controlled. Satisfaction-performance causal relationships were supported in only two of the eight specialties during the specialty specific analyses. In a weather forecaster specialty, results suggested that perceived utilization influenced performance as reflected in APR scores. In a munitions and weapons specialty, extended regression analyses suggested that job interest influenced test performance which in turn influenced subsequent job interest. Whereas, the weather specialty finding reinforces a popularly held concept that satisfaction affects productivity, the total sample and munitions specialty findings suggest that a more complex relationship exists where both satisfaction and performance subsequently influence the other. A circular causality relationship is consistent with the theoretical position taken by Tuttle and Hazel (1974) as described in the beginning of this report. As has been the case in other

aspects of job satisfaction studies, relationships between job attitudes and performance measures tend to be career ladder specific. Few generalizations can be made concerning the relationships, and career-ladder specific studies must be performed.

Racial Differences in Terms of Work Assignments and Job Attitudes

During the early months of this job satisfaction research project, there was considerable interest among governmental agencies concerning proper utilization of minorities. Particular concern related to numerous charges of racially discriminatory assignment policies and the detrimental effects of those policies. As a byproduct of a larger study of first-term airmen in 11 career ladders, Christal (1972) analyzed racial differences on variables such as the difficulty level of work assigned and resulting job attitudes. Approximately 19 percent of the 11,380 case sample was Black and the tenure of the Blacks approximated that of the non-Blacks. Using multiple-linear regression techniques, the unique contribution of race in accounting for the number of tasks assigned and the average difficulty level of tasks performed per unit time was not significant in any of the 11 ladders. There appeared to be no practical differences in the types of assignments given to Blacks and non-Blacks within career ladders. No significant differences were found in expressed job interest or perceived utilization of talents and training between Blacks and non-Blacks in nine of the career ladders. However, Blacks in two ladders, Communications Center Specialists (291X0) and Administrative Specialists (702X0) reported higher levels of job interest and perceived utilization than non-Blacks. These differences were statistically significant, but were relatively small accounting for only 1 to 3 percent of the job attitude variance.

A later analysis of 3,000 respondents to the OAI categorized individuals as a Black, Spanish/Mexican-American, or other racial group and found no racial differences on 34 specific job attitude facets. There were small but significant differences on a Pay and Benefits facet where the Blacks expressed more satisfaction than other racial groups. To date, no practical within specialty racial differences in the types of job assignments or subsequent job attitudes have been found.

Leadership Styles and Effects on Job Satisfaction and Performance

Supervisory competence was a specific job satisfaction factor obtained during analysis of the OAI. Adequate supervisory experience in tasks supervised has been identified as a contributor to supervisor and incumbent job satisfaction or, when absent, dissatisfaction (Stacy & Hazel, 1975). In addition to a supervisor's technical competence, his leadership style is presumed to influence his effectiveness as a manager, where effectiveness is measured in terms of incumbent performance and satisfaction. A first step in verifying this assumption is the development of a dynamic leadership effectiveness model.

Hendrix (1976) conducted a literature review, identified and synthesized eight leadership contingency theories or approaches to leadership behavior, and developed an eclectic model titled "The Three-Component Leadership Effectiveness Model." The model considers leadership effectiveness to be an interactive function of the criterion selected, the leadership style employed, and the situational environment which includes the leader's subordinates, peers, and other personnel in the environment. The strength of this model is that: (a) it provides a useful descriptive framework for depicting the phenomenon of leadership or management behavior, (b) it presents leadership as a dynamic decision-making process which requires modification when changes occur in the environment, and (c) it is a model that lends itself to testing and therefore can be verified.

Before hypothesis testing can begin, however, additional research is required in order to establish relevant categories of leadership styles and situational environments. Should the basic propositions associated with the model be supported by research evidence, then the model can: (a) assist in providing a means for selecting managers for specific types of positions, (b) assist in providing a means for management development, (c) assist in providing a useful research paradigm, and (d) be captured mathematically for highly effective managers or leaders and implications drawn for techniques best suited to varied work situations found in the Air Force. These implications could then be used by less effective managers as an aid to decision-making, or the findings could be used in formal managerial training programs.

Effective management is a key ingredient to increased job productivity and job satisfaction, which is in line with the Air Force's present requirement to "do more with less." The Three Component Leadership Effectiveness Model is a first step in accomplishing this goal.

Review of the Job Enrichment Literature and Implications for Air Force Research

Another literature review (Watson & Zumbro, 1977) concentrated on the job enrichment movement. The movement has found great favor among industrial and Department of Defense managers. Drawing largely on the two-factor theory, job enrichment programs have generally sought to vertically enlarge jobs through providing more autonomy, responsibility, and technical challenge to the incumbents. Operationally, this means that an individual or work team completes a whole product, as opposed to piecework, and receives less supervision in the process.

Proponents of the job enrichment movement speak of it as the panacea of work motivation and the movement enjoys considerable popularity. Opponents to the movement are varied in background and purpose, but their numbers and supportive evidence are growing. Strong criticisms are being leveled by congressional, union, and behavioral research sources as well as the workers themselves. From the available wealth of job enrichment literature, this writer concludes: (a) two-factor theory approaches to job enrichment make the assumption that elements extrinsic to the job itself (supervision, salary) contribute to job dissatisfaction and are distinct from elements which contribute to job satisfaction (the work itself) – a distinction not empirically supported, (b) job enrichment programs are generally poorly documented and lack adequate research methodology, (c) current job redesign programs are not being sufficiently applied to the lower-level blue-collar occupations where they are needed, (d) enrichment approaches have not considered individual differences and this failure to control for personality and background variables may have confounded the reported results, (e) multiple modifications made in jobs were not objectively measured so effects of specific changes are not known, (f) lack of longitudinal studies and failure to control for effects of direct experimental interventions could mean that reported improvements in motivation or production are the result of Hawthorne effects (*temporary* improvements often observed after a substantial change is made in an environment), and (g) job enrichment approaches are predicated on the axiom that work itself has an inherent motivating value. Empirical evidence supports the conclusion that an inherent motivating value of work is not universal, is dependent on the individual worker, and is a value held more by researchers and managers than lower-level workers.

The job enrichment review contains several implications for an Air Force job satisfaction research program. Specific task-level elements of jobs must be empirically measured. Any attempt to evaluate effects which changes in job characteristics have on job satisfaction or performance must try to avoid the pitfalls of experimental interventions. Also, characteristics of the job incumbents' must be held constant to evaluate job change effects. Longitudinal validation of initial findings are a necessity.

The Air Force is in a unique position to evaluate the type of job changes which affect attitudes and the direction and magnitude of those effects without the influence of concomitant variables associated with experimental interventions. Many thousands of major changes occur every year in Air Force enlisted jobs through transfers, equipment and procedural modifications, and discharges which provide new work environments or produce redistributions of work tasks within environments. Using longitudinal administrations of the Occupational Surveys, task-level specific definitions of jobs can be obtained for individuals at two points in time, and the normally occurring changes in variety, complexity, and responsibility levels can then be associated with changes in job satisfaction. The basically static nature of civilian blue-collar jobs and restrictions imposed on large work force changes by unions prevent in-depth objective investigations of job attitude and job attitude change correlates. Longitudinal job change and attitude change data have been collected on several career ladders and analyses are underway. Relationships uncovered may have profound implications for job structuring or reengineering within these specialties as well as provide basic guidelines for those who establish or set work procedures.

III. CURRENT STUDIES

Current studies are (a) analyzing OAI returns of 7,800 airmen for between and within career ladder satisfaction differences and identification of ladder specific job factors which impact on career decisions; (b) identifying additional career ladders for in-depth research where manipulable job content factors are related to unacceptably low reenlistment rates; (c) expanding the methodology for identifying critical task

experiences for supervisors; (d) in two specialties, evaluating changes in job content which have occurred normally in individuals' jobs through job progression or reassignment during a 13- to 18-month time period - job changes will be related to job attitude changes during the same period; (e) determining the amount of variance in job attitudes and performance ratings which is related to motivational and interest characteristics of individuals and is not a function of the work environment and therefore not subject to change through work interventions; (f) elaborating on the relationships between work environment and job attitudes and productivity; and (g) developing techniques for first-line supervisors to increase the intrinsic motivation and thus productivity and satisfaction of subordinates.

IV. CONCLUSION

The job satisfaction research project has been highly productive through its fourth year. Later years should see additional applications of the evolving technology as well as refinements in the procedures for identifying relevant problem areas and specifying remedial actions. The prognosis is very promising for the projected goal of full utilization of personnel, retention of qualified airmen, and maintenance of critical skills. Preliminary studies which concentrated on technology development have had side benefits of meeting some of these goals in the sample specialties studied. From a cost effective standpoint, and in an era of increasing personnel costs and decreasing budgets and strength authorizations, small percentage gains in productivity and retention of trained personnel will produce substantial returns from minimal research efforts.

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